

# Sports Medicine

FOR THE PRIMARY CARE PROVIDER

## Acute Mountain Sickness Prophylaxis

BY MATTHEW SILVIS, M.D.

*A 48 year-old patient from Hershey (elevation 410 feet/125 meters) has plans in February to ski in Colorado (elevation 11,500 feet/3505 meters). He was wondering if he should take anything to prevent altitude sickness. What should you recommend to your patient?*

Altitude illness is a broad category of disease including acute mountain sickness (AMS), high altitude cerebral edema (HACE), and high altitude pulmonary edema (HAPE) that affects susceptible persons who travel to elevations greater than 8,200 feet/2,500 meters without adequate acclimatization. AMS is the most common form of altitude illness affecting 25 percent of travelers at moderate altitude and 50-85 percent of travelers at 13,100 feet/4,000 meters. HACE and HAPE are much less common (0.1-0.4 percent), more severe, and not typically observed below 13,100 feet/4,000 meters. The focus of this article is AMS.

The major risk factors for altitude illness include rapid ascent, poor acclimatization (no recent exposure greater than 4,000 feet/1,200 meters), physical exertion at altitude, young age, and history of prior altitude illness. An individual's level of aerobic fitness does not protect against developing altitude illness, although obesity and lung disease both increase risk.

Headache that occurs with an increase in altitude is the main symptom of AMS. Other symptoms include anorexia, nausea, dizziness, malaise, or sleep disturbance. AMS usually begins within six to twelve hours after ascent to 8,200 feet/2,500 meters or higher.

AMS can be prevented by ascending 980-1,640 feet/300-500 meters per day at altitudes above 9,800 feet/3,000 meters and including a rest day every three to four days. Staying several days at intermediate altitudes at or above 6,500 feet/2,000 meters or hiking and climbing on day tours above 9,800 feet/3,000 meters may also be of benefit.

Prophylactic medication has been studied to prevent AMS. If AMS risk is low (planned slow ascent with no personal history of altitude illness), two medications have shown to be helpful: acetylsalicylic acid (320 milligrams(mg) taken three times per day at four hour intervals), starting an hour before ascent; or ibuprofen (600 mg three times per day) starting a few hours before ascent. If AMS risk is high (planned quick ascent and/or history of altitude illness), acetazolamide should be considered. Acetazolamide is a renal carbonic anhydrase inhibitor that decreases water reabsorption and increases excretion of sodium, potassium, and bicarbonate. It acidifies the blood, causing an increase in respirations to aid in acclimatization. Adverse effects can include diuresis and paresthesia of the fingers and toes, but may be reduced by limiting use to 125 mg by mouth every twelve hours. Acetazolamide is related to sulfonamides and should be avoided by patients with sulfa allergies. Dexamethasone 4 mg twice daily can be used in this case. Ginkgo and phosphodiesterase inhibitors have limited data for the prevention of AMS.



### Dear Health Care Provider,

My name is Matthew Silvis. I am medical director of primary care sports medicine at Penn State Hershey. I have enclosed the winter edition of our *Primary Care Sports Medicine Newsletter*, a biannual newsletter of seasonal sports topics. We hope you find the information useful, and would appreciate any feedback you have to enhance our efforts. We have selected a variety of topics for this issue. Our guest writer is Pamela Zerbe, a speech therapist specializing in the care of athletes with concussions.

If you'd like to receive this newsletter by email, please send your email address to my administrative assistant, Jeanne Laicha at [jlaicha@hmc.psu.edu](mailto:jlaicha@hmc.psu.edu). Please send any future topic ideas to Jeanne Laicha or myself at [msilvis@hmc.psu.edu](mailto:msilvis@hmc.psu.edu).

Enjoy,

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# The Evolving Field of Hip Pain and Treatment

BY SCOTT LYNCH, M.D.

Diagnosis and treatment of young patients with hip pain is an evolving field. A focus has recently been placed on the labrum and associated pathologies. These are usually referred to as femoroacetabular impingement (FAI). As with any newly discovered cause of pain, there remains much controversy in its clinical presentation and treatment options. The second phenomenon with any new diagnosis is the rush to attribute any and all unexplained pain to the newly discovered pathology. Such has been the case with labral tears and FAI. We must resist this temptation, and continue to adhere to the principles of obtaining a good patient history and thorough exam as the cornerstones of diagnosis. This is particularly important for labral tears since studies in asymptomatic active populations have shown a high incidence of labral tears. Our study on professional hockey players has shown an incidence of 63 percent.

Although hip dislocations can cause labral tearing, it is now felt that most symptomatic labral tears are a secondary injury caused by morphological differences in the shape of the acetabulum or femoral head, and perhaps an association with the rubbing of the iliopsoas tendon over the anterior labrum.

## There are two described types of FAI:

CAM type is a bony prominence at the femoral head-neck junction that causes the femoral head to lose its roundness, so that it does not roll properly into the acetabulum, particularly during hip flexion with internal rotation. This is more common in men. Pincer type is an overgrowth or malrotation of the acetabulum that causes overhang of the anterior rim. This causes the femoral neck to bump into the acetabulum during hip flexion, especially when combined with internal rotation. This type is more common in women. However, either type may occur in both sexes. In fact, patients can, and often do, have both CAM and Pincer impingement together.

Intra-articular pathology of which labral tears and FAI are subsets, are thought to cause groin pain. Some other common causes of groin

pain are osteoarthritis, acetabular dysplasia, athletic pubalgia, muscle strains, tendonitis, snapping tendons (usually the iliopsoas when in the groin), and hernias or other lower abdominal pathology. There is so much overlap of these problems that it is often difficult to determine the pain generator, especially when the incidence of asymptomatic labral tears is so high. FAI is a chronic problem, so it generally does not have acute onset of symptoms. The patient typically complains of more pain with prolonged sitting, since this puts the hip in the position of impingement. When asked to localize the pain, patients often hold their hand over the hip in a C position, indicating the pain is deep in the groin and radiating from anterior to posterior. This is called a "C sign." For symptomatic FAI, the hallmark physical exam sign is pain located in the groin during passive flexion and internal rotation of the hip.

Plain radiographs, including a true AP pelvis and lateral of the hip, are essential for ruling out other causes of the pain, such as osteoarthritis or dysplasia, and for seeing the bony changes that are present in FAI. If other pathology is identified, there may be no need for an MRI. When labral pathology is still suspected an MRI done with intra-articular gadolinium is helpful. At our institution, lidocaine is added to the intra-articular injection and a physical exam is done to test for FAI. If the pain is from something intra-articular, the lidocaine should improve the patient's pain during the test.

For mild to moderate symptomatic forms of FAI, surgery can often be done through the arthroscope. Trimming of the acetabulum, reshaping the femoral head, and labral repairs or debridement are common components of the surgery. For more extensive deformities, or procedures requiring posterior wall acetabular deformities, an open surgical dislocation can be performed. Rehabilitation time varies from two to three months for most of the arthroscopic procedures, to nine to twelve months for the open procedures. Long-term results are not yet available since these are relatively new diagnoses and procedures, but hope is to ultimately prolong the life of the native joint.

# Skin Conditions in Wrestlers

BY EMUEJE OPHORI, M.D., CHIEF RESIDENT, DEPARTMENT OF FAMILY AND COMMUNITY MEDICINE

Skin disorders have been identified as some of the most common reasons wrestlers reportedly miss practices and matches. It is essential for sports medicine providers to be familiar with diagnosing common skin conditions during a complete head-to-toe skin exam, for appropriate treatment to be initiated. Skin infections are often spread through close contact during practice, in locker rooms, on buses, and on sideline benches. Warm, moist skin under tight-fitting equipment and clothes can promote bacterial and fungal growth. Furthermore, skin trauma, abrasions, or cuts during practice or competition, can provide an entry point for infection.

Bacterial conditions including impetigo, cellulitis, erysipelas, and folliculitis usually sparing the palms and soles, may present as bullae,

vesicles, or crusts. These diagnoses require a period of oral antibiotic treatment prior to returning to play. Those caused by methicillin resistant staphylococcus aureas (MRSA) may require advanced care. Conditions such as abscesses, carbuncles, and furuncles commonly appear in places of friction such as the axillae, groin, and posterior thigh. In the majority of cases, these pus-filled lesions, require a simple incision, drainage, and may not always necessitate oral antibiotics in an otherwise healthy athlete.

Fungal skin infections caused by contact with skin or inanimate surfaces have a very high prevalence in wrestlers and have at times been described in epidemic proportions. These disorders are typically seen and named according to the warm, sweaty areas of the body in which

# Speech Pathology and the Concussed Brain

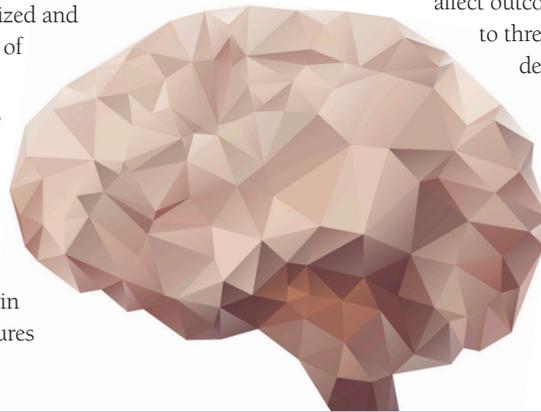
BY PAMELA ZERBE, SPEECH PATHOLOGIST

Imagine trying to get through your work day efficiently while walking through thick mud. Not too fast? Falling down a little? Possibly even moving backwards at times? You're probably feeling frustrated, irritable, and your self-esteem is decreasing at a rapid rate. This is how many of our post-concussive patients explain their deficits' impact on their day.

Post-concussive patients (pediatric through adult) are referred for a cognitive-linguistic evaluation through speech language pathology approximately six to eight weeks post-onset for ongoing symptoms which may include one or many of the following: trouble with memory, diminished attention, slow processing speed, difficulty multi-tasking, dysfluency, anomia, and scattered thought organization.

You may be surprised to hear that the extent of injury does not always correlate to the lasting effects. For example, one of our patients got up quickly from her bunk bed and knocked her head on the top bunk leaving her with significant post-concussive deficits. Of course, we understand the devastating effects of car accidents, large falls, physical altercations, etc. At times, we are surprised by the lack of persistent effects from such large injuries. It is important, that we, as practitioners, recognize the symptoms regardless of type of injury and request assistance from our colleagues to rule out any lasting effects of concussion to support our patients and their families as they go through their journey together.

Speech pathologists use a variety of standardized and informal testing measures to determine areas of strength and weakness which then leads to treatment plans, classroom accommodations, or home and work recommendations. We are fortunate to be the recent recipient of a research-backed treatment protocol, BrainTrain Mind Power Builder, from Children's Miracle Network, which complements our already vast variety of therapy tools. BrainTrain is a computer program that objectively measures



short-term memory, attention, and reaction time while allowing the clinician to increase task difficulty and background distractions as needed to help patient progression. Feedback among adults and children has been positive, and patients are requesting this tool as their preferred treatment activity. During therapy sessions, we also address compensatory strategies with patients such as using a memory strategy (repetition, association, visualization, chunking, etc.), implementing use of a calendar, and setting alarms as reminders. We will often discuss socio-emotional effects of injury with the patient, assure them that most of their symptoms are typical for a post-concussive individual, assist family members with their understanding on how best to work with their loved one, set realistic expectations, and identify signs that professional psychological intervention would be warranted.

Our comprehensive treatment program would not be complete without the collaboration of our colleagues. We often refer to and work with physical therapy, occupational therapy, psychology, neuropsychology, educational institutions, vocational personnel, and referring physicians. This holistic approach allows for the most comprehensive and efficient treatment plan that is individualized for each person.

Recovery from symptoms is unique to each individual. Coexisting conditions, such as depression, anxiety and pain, may negatively affect outcomes. Length of treatment varies from two to three visits to four or more months, again depending on coexisting conditions, as well as compliance with rest recommendations. Referrals to Penn State Hershey Therapy Services can be completed electronically or by calling 717-531-8070. Typically, patients are referred six to eight weeks post-onset, due to ongoing post-concussive cognitive-linguistic deficits (changes in memory, attention, processing speed, etc.).

they affect: feet (tinea pedis), groin (tinea cruris), skin folds and other areas of the body (tinea corporis/gliatorum), and the scalp (tinea capitis). When conditions such as "jock itch" and "athlete's foot" break out on wrestling teams, providers should be diligent in examining the scalp, as many cases of tinea capitis in wrestlers are asymptomatic. Most fungal skin disorders can be treated adequately with topical antifungal creams or oral medication in severe cases with variable length of treatment.

Viral, mechanical, and other skin disorders including herpes, warts, acne mechanica, intertrigo, friction blisters, scabies, and lice are also frequently observed in wrestlers. Herpes gladiatorum (caused by the herpes simplex virus) is incurable; recurrent outbreaks may lead to

visible vesicles, which may be transmitted by skin-to-skin contact. Guidelines for prevention and treatment by athletic governing bodies ensure transmission is kept to a minimum to allow for participation.

Prompt diagnosis and treatment of bacterial, fungal, viral, mechanical, and other dermatologic conditions in athletes, particularly in wrestlers, may allow for expedited return to play, prevent progression, and minimize spread to other competitors. These conditions present atypically at times, therefore providers should become familiar with these disorders and settings in which they manifest. Consultation and reference to regulations outlined by the PIAA should be sought when needed.

# Pre-Participation Physical Exam with the Functional Movement Screen™

BY SCOTT DEIHL, ATC, PTA, AND CAYCE ONKS, D.O.

The pre-participation physical exam (PPE) is required before athletes enter athletic activities and some occupations involving exertion. The exam attempts to screen for medical problems that may put individuals at risk with physical activity. Currently, the pre-participation physical exam has little evidence to support any one tool to assess for movement limitations, dysfunctions, or asymmetries which may place individuals at risk for musculoskeletal injury.

The Functional Movement Screen (FMS™) is an evaluation tool that assesses functional movement patterns of an individual. The FMS™ is comprised of seven movement patterns (the deep squat, hurdle step, inline lunge, shoulder mobility, active straight-leg raise, trunk stability push-up, and rotary stability) and three clearing tests to assess pain while performing shoulder impingement, press-up, and posterior rocking tests. The FMS™ requires a balance of mobility and stability. Presence of pain while performing these maneuvers constitutes a positive clearing exam and would suggest that the individual should be evaluated by a physician.



The scores for the FMS™ range from zero to three. To obtain a score of “three,” the individual has an unquestioned ability to perform a functional movement pattern. The score of “two” is the ability to perform a functional movement pattern, but some degree of compensation is noted. The score of “one” is the inability to perform or complete a functional movement. A “zero” is given to individuals who have pain while performing the task. When this occurs, the screening is terminated and appropriate referral should be made for further evaluation.

The majority of FMS™ tasks are scored for the right and left sides respectively. The lower score of the two sides is recorded and is counted toward the total. The clearing tests are scored as positive (painful), or negative (non-painful). The best score an individual can attain on the FMS™ is twenty-one.

Research has shown a player with a FMS™ score of fourteen or less has an eleven-fold increased chance of injury when compared to a player whose score was greater than fourteen at the beginning of the season. Another study using military officer recruits found that soldiers with an FMS™ score of less than or equal to fourteen had a 1.91 times higher injury incidence rate compared with a score greater than fourteen. Studies with other sports and occupations have produced conflicting results.

The pre-participation physical exam can be used as a means to identify athletes who may not be able to safely participate in athletics without further evaluation. Further research is needed to determine if performing the FMS™ is a useful means for screening athletes for musculoskeletal injury.

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